

CASE REPORT

Isolated asymptomatic skeletal muscle metastasis in a potentially resectable non-small cell lung cancer: detection with FDG PET-CT scanning

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Abstract

Asymptomatic skeletal muscle metastasis in non-small cell lung cancer is a rare event particularly when it is detected at initial staging. This report describes how whole body imaging with [¹⁸F]fluorodeoxyglucose (FDG) positron emission tomography (PET)-computed tomography (CT) detected a solitary asymptomatic metastasis to the gluteus maximus muscle in a potentially resectable case of non-small cell lung cancer, thereby changing the treatment plan from surgical resection to systemic chemotherapy.

Keywords: *Non-small cell lung cancer; positron emission tomography; skeletal muscle metastases.*

Introduction

Lung cancer is one of the leading causes of cancer deaths and despite advances in diagnosis and treatment, the overall 5-year survival remains dismal at 14% for all stages (clinical staging)^[1]. Distant metastases in lung cancer commonly involve the adrenal glands, liver, bones and brain^[2]. Since the extent of disease decides the treatment options, radiological imaging plays an important role in staging evaluation. Positron emission tomography (PET) imaging with [¹⁸F]fluorodeoxyglucose (FDG) is now being increasingly used for characterizing lung nodules, for initial staging, restaging, treatment planning and assessing response to treatment in lung cancer^[3]. We report a rare site of metastasis to the skeletal muscle in a case of lung cancer detected at initial staging with FDG PET-CT.

Case Report

A 36-year-old man with a 12-year smoking history presented with cough and weight loss for 2 months. A chest

radiograph revealed a well-defined opacity in the left upper lobe.

A contrast enhanced computed tomography (CT) scan was performed which showed a 6.0 × 5.4 cm sized lobulated mass in the left upper lobe that did not involve the chest wall or the mediastinal structures. An ipsilateral mediastinal paraaortic node was noted measuring 1.5 cm in size. CT guided biopsy of the lung mass revealed a histopathological diagnosis of adenocarcinoma. On the basis of these findings, the tumor was staged as T2N2Mx and deemed potentially resectable. A whole body [¹⁸F]FDG PET-CT scan was performed as per the hospital protocol for potentially operable lung cancers. It revealed increased FDG uptake in the primary mass and the mediastinal paraaortic node (standardized uptake value (SUV) 16.5 and 7.9 respectively). Focal increased FDG uptake was also seen in the left gluteus maximus muscle (SUV 8.0) and there were no other areas of increased FDG uptake. The gluteal nodule was not palpable on clinical examination. Ultrasonography (USG) was performed to evaluate the gluteal lesion followed by guided fine needle aspiration cytology (FNAC). USG showed a 1.2 × 1.0 cm sized hypoechoic

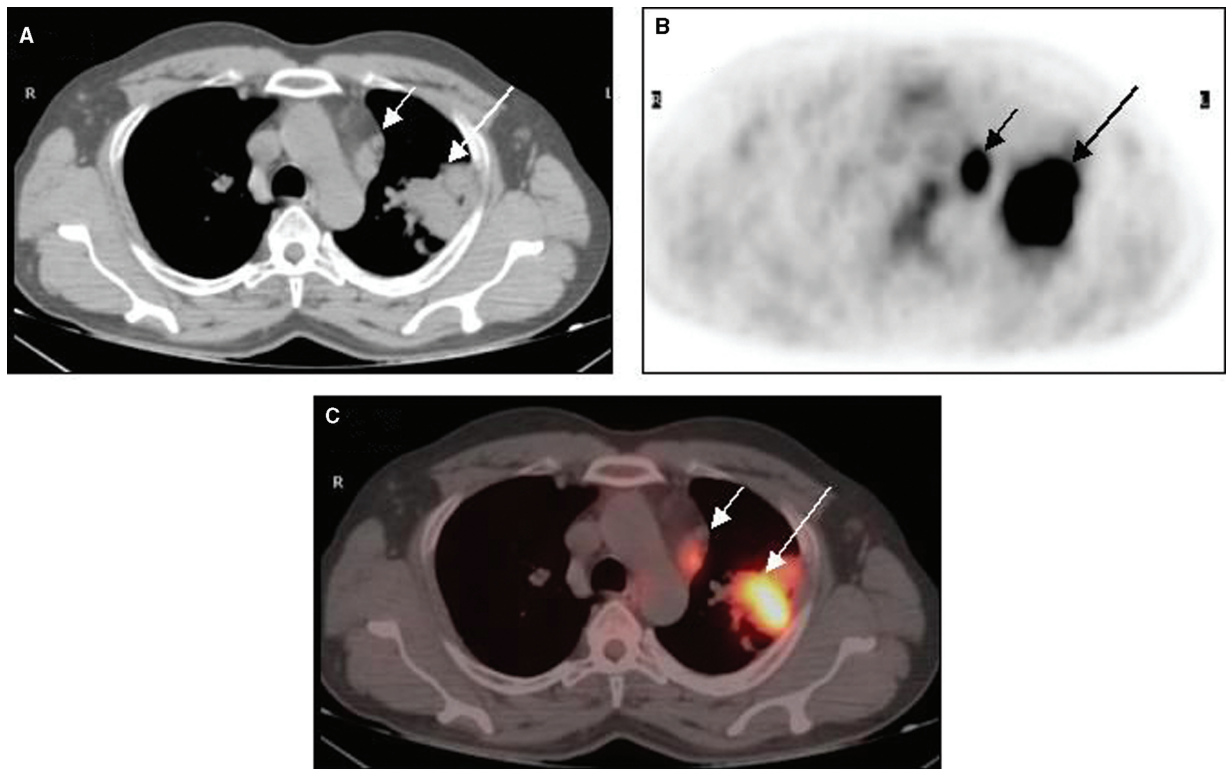


Figure 1 (A) CT scan showing the primary lung mass in the left upper lobe (long white arrow) and the enlarged mediastinal node (short white arrow). (B,C) Axial PET and fusion PET-CT images show the FDG avid mass in the left upper lobe (long arrow) and mediastinal node (short arrow).

nodule in the gluteus maximus muscle. Cytology from the gluteal nodule revealed adenocarcinoma cells consistent with the known primary in the lung.

In view of skeletal muscle metastasis, the patient was upstaged (stage IV) and the intent of the treatment changed from potentially curative surgery to palliative systemic chemotherapy.

Discussion

Lung cancer is one of the leading causes of cancer death in both men and women worldwide. Most patients present at an advanced stage and hence despite developments in diagnosis and treatment the mortality remains high. Distant metastases of lung cancer commonly involve the adrenal glands, bone and brain. Contrast-enhanced CT scan of the thorax (including the adrenals) along with a radionuclide bone scan and brain imaging (with CT or magnetic resonance imaging (MRI)) was considered as optimal staging work up prior to the advent of PET scanning.

Metastases to skeletal muscle from primary lung cancer is a rare event with very few reports described in the literature^[4–6]. Various physiological factors like tissue blood flow, pressure and metabolism have been cited as the possible reasons why metastases to skeletal muscle are rare. According to some studies, the presence

of proteases and certain inhibitors in muscle tissue are responsible for blocking tumor invasion and growth^[7,8].

It has been shown that FDG PET is an excellent imaging modality for metastatic evaluation with the exclusion of the brain. It can detect occult metastases in about 10–20% of cases of non-small cell lung carcinoma (NSCLC)^[9–11]. In a study of 167 patients of NSCLC (stages I–III), FDG PET detected unsuspected distant metastases in a high proportion of patients who were otherwise candidates for potentially curative treatment^[12]. However, of the 32 cases of distant metastases in the study, there were no cases of skeletal muscle metastasis, emphasizing the rarity of the event. Most cases of skeletal muscle metastases described in the literature presented with clinical symptoms of pain and swelling at the affected site. However, our patient had no symptoms related to the site of skeletal muscle metastasis. It was only suspected after the PET-CT study, which revealed intense focal uptake in the gluteus maximus muscle. Although focal FDG uptake in the deeper subcutaneous tissue of the gluteal region is not uncommonly observed as a result of injection site inflammation, the intense nature of the uptake and its deep location in the muscle was suspicious enough to warrant further evaluation. A USG guided FNAC confirmed the metastatic nature of the gluteal lesion. Detection of solitary extrapulmonary FDG uptake in patients with recently



Figure 2 (A) Fusion PET-CT image shows the FDG avid nodule in the left gluteus maximum muscle (white arrow). (B) Ultrasonography shows a hypoechoic nodule in the gluteus maximum muscle. Guided fine needle aspiration was performed from this nodule. (C) Coronal short tau inversion recovery (STIR) MRI image shows a hyperintense nodule in the left gluteus maximus muscle.

diagnosed lung cancer, as is the case in our report, should be critically analyzed as nearly half of these lesions may represent a malignant etiology^[13]. The increasing use of PET-CT as a whole body staging tool for various cancers has recently led to several reports describing unsuspected distant metastases at unusual locations. Unusual metastases of lung cancer to colon and to the extraocular muscles that were detected by PET-CT have been reported^[14,15].

There is no consensus on the optimal treatment strategy for skeletal muscle metastases and although the options could include radiotherapy, chemotherapy or excision, the outcome remains poor. Although radical treatment of the primary and the solitary metastatic lesion could have been considered as a treatment option, our patient was offered palliative chemotherapy in view of the systemic nature of the disease.

Thus FDG PET-CT, due to its whole body screening ability, can unmask unusual metastatic sites at initial

presentation and can help in reducing inappropriate surgeries in these patients.

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